USPTO
APR 07 2008
PATENT & TRADEMARK OFFICE

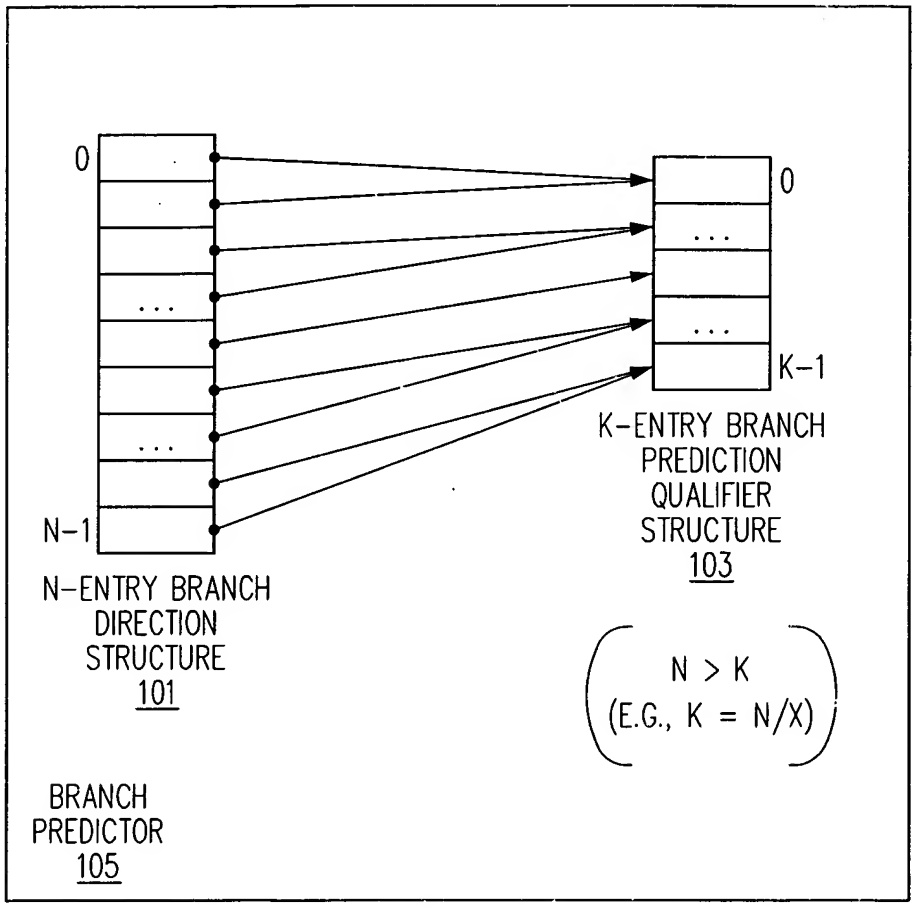

FIG. 1

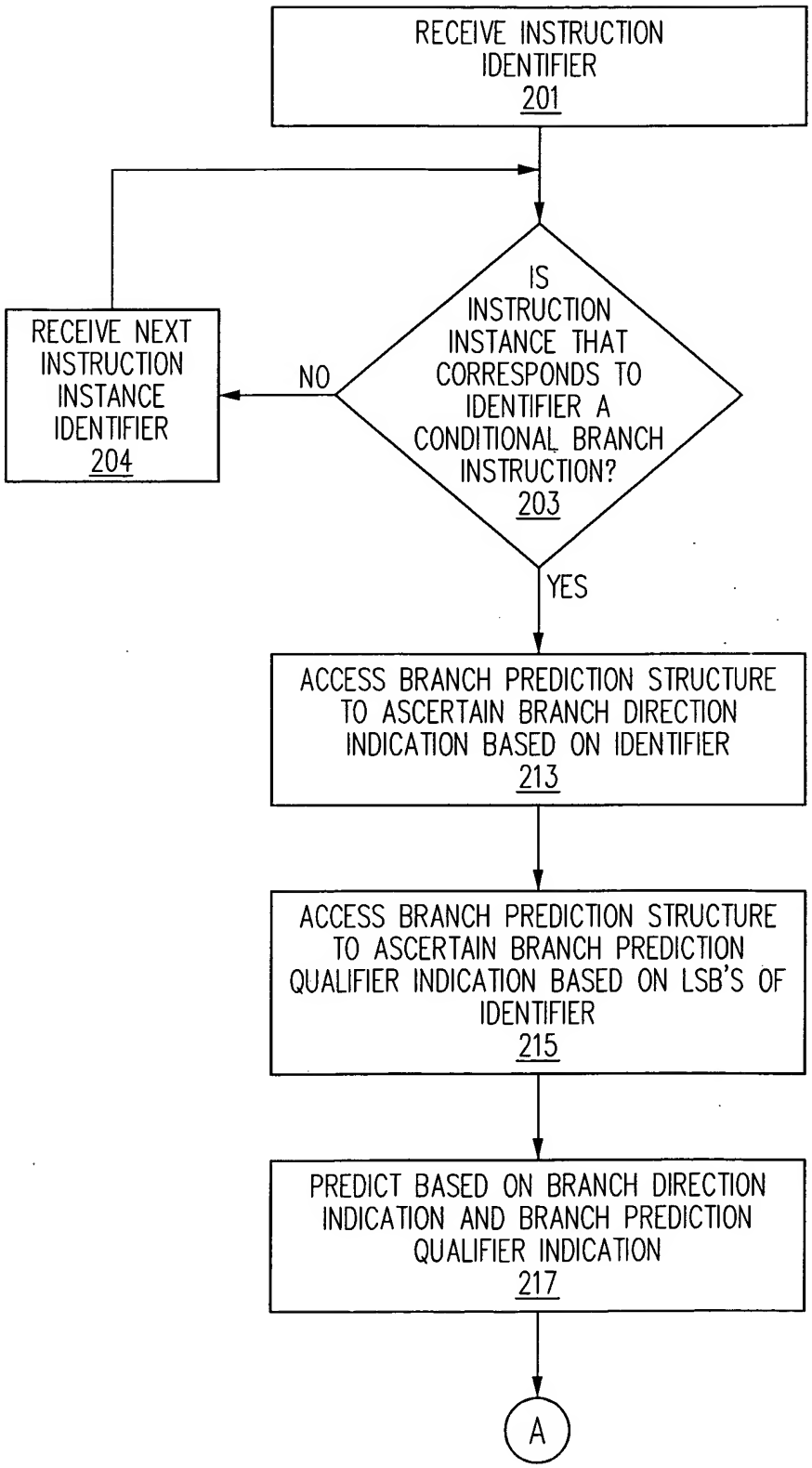
RECEIVE INSTRUCTION IDENTIFIER 201
IS INSTRUCTION INSTANCE THAT CORRESPONDS TO IDENTIFIER A CONDITIONAL BRANCH INSTRUCTION? 203
NO
RECEIVE NEXT INSTRUCTION INSTANCE IDENTIFIER 204
YES
ACCESS BRANCH PREDICTION STRUCTURE TO ASCERTAIN BRANCH DIRECTION INDICATION BASED ON IDENTIFIER 213
ACCESS BRANCH PREDICTION STRUCTURE TO ASCERTAIN BRANCH PREDICTION QUALIFIER INDICATION BASED ON LSB'S OF IDENTIFIER 215
PREDICT BASED ON BRANCH DIRECTION INDICATION AND BRANCH PREDICTION QUALIFIER INDICATION 217
A

FIG. 2A

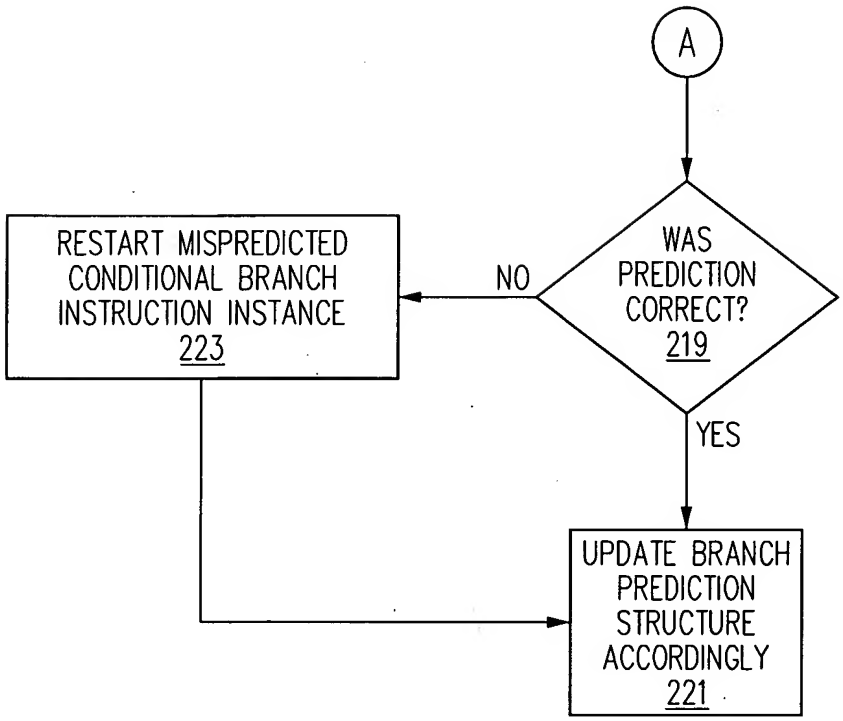
A
WAS PREDICTION CORRECT? 219
NO
YES
RESTART MISPREDICTED CONDITIONAL BRANCH INSTRUCTION INSTANCE 223
UPDATE BRANCH PREDICTION STRUCTURE ACCORDINGLY 221

FIG. 2B

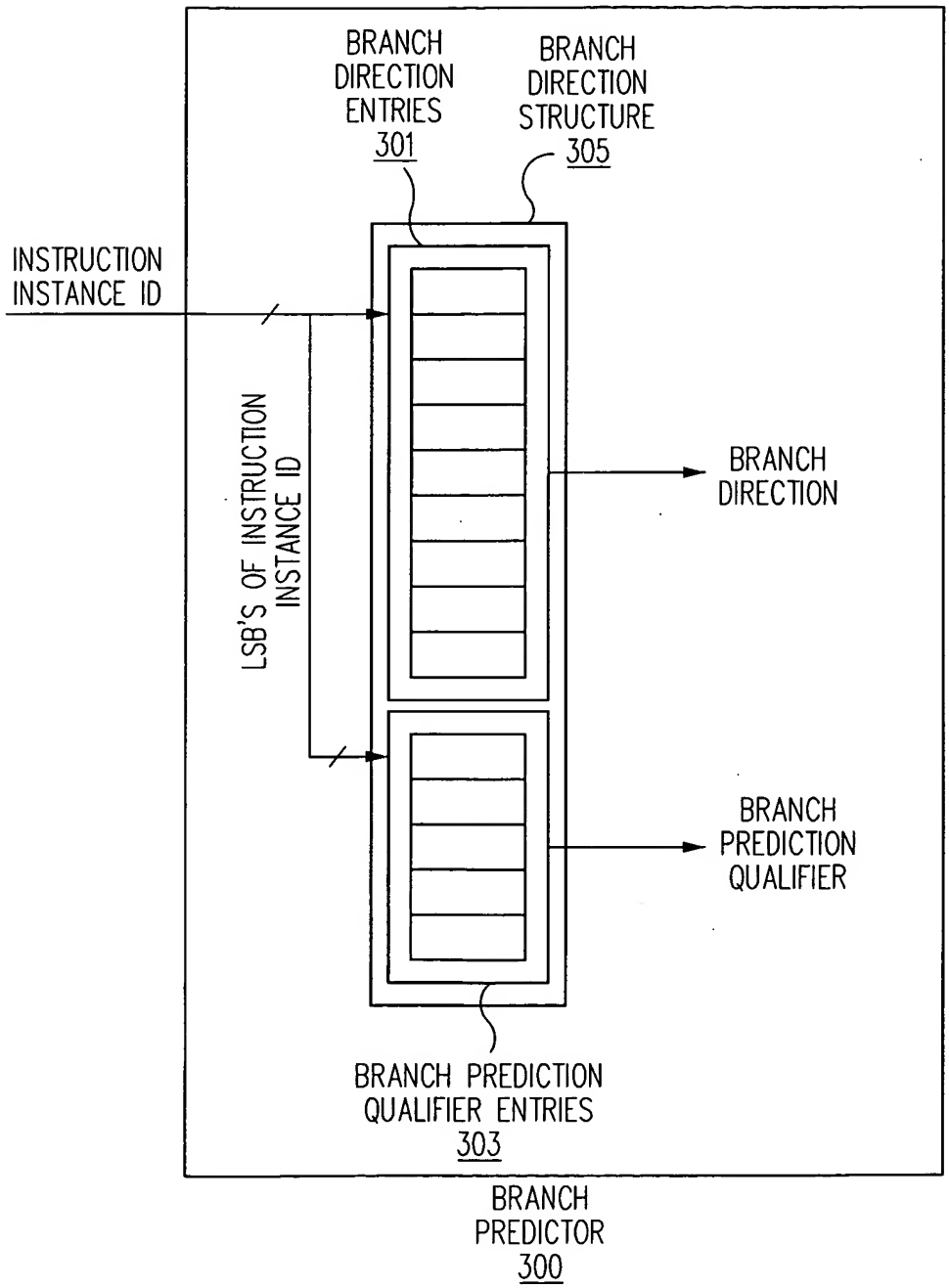
BRANCH DIRECTION ENTRIES 301
BRANCH DIRECTION STRUCTURE 305
INSTRUCTION INSTANCE ID
LSB'S OF INSTRUCTION INSTANCE ID
BRANCH DIRECTION
BRANCH PREDICTION QUALIFIER
BRANCH PREDICTION QUALIFIER ENTRIES 303
BRANCH PREDICTOR 300

FIG. 3

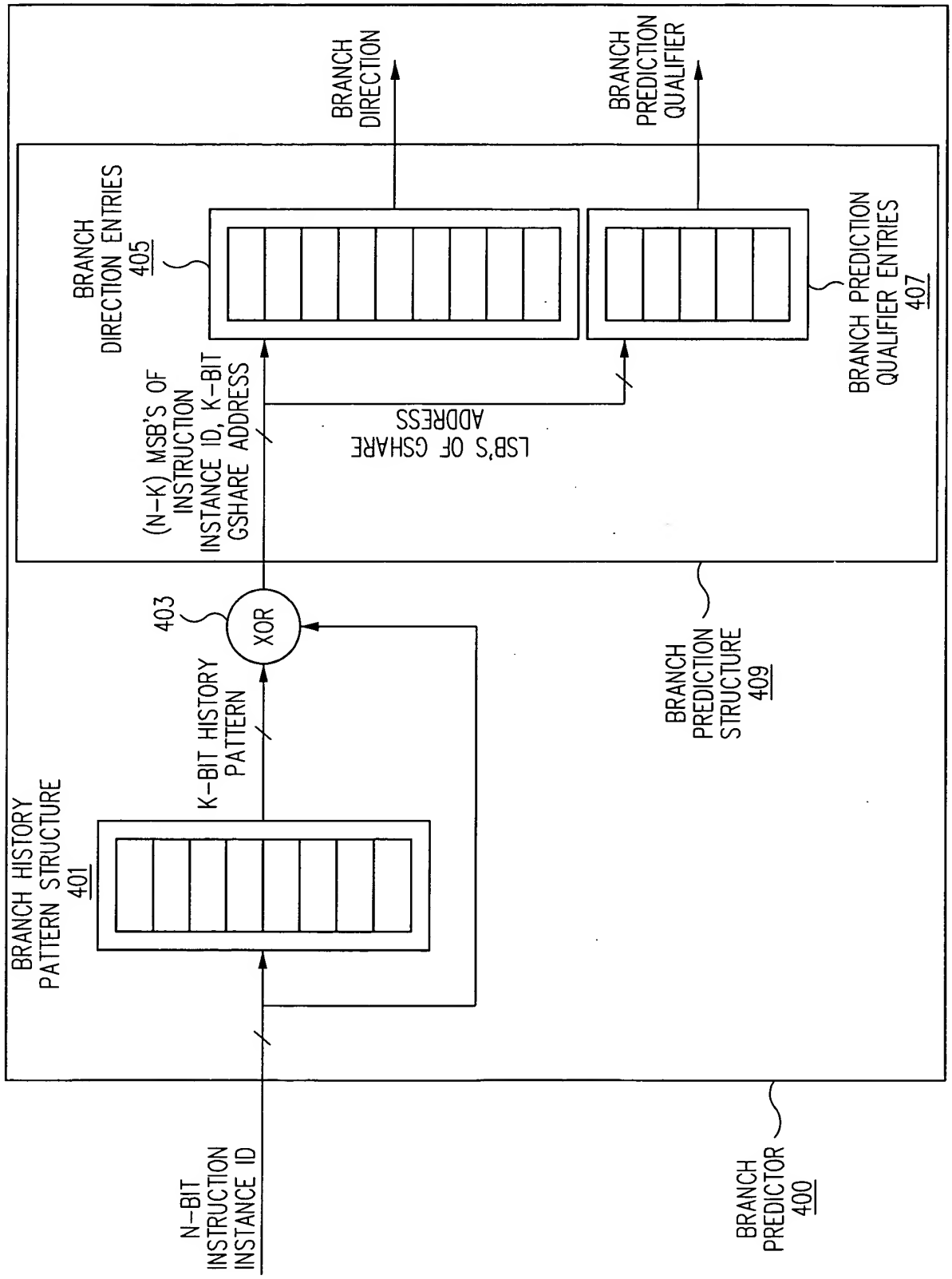
BRANCH PREDICTOR
400
N-BIT INSTRUCTION INSTANCE ID
BRANCH HISTORY PATTERN STRUCTURE
401
K-BIT HISTORY PATTERN
403
XOR
(N-K) MSB'S OF INSTRUCTION INSTANCE ID, K-BIT GSHARE ADDRESS
LSB'S OF GSHARE ADDRESS
BRANCH DIRECTION ENTRIES
405
BRANCH PREDICTION QUALIFIER ENTRIES
407
BRANCH PREDICTION STRUCTURE
409
BRANCH DIRECTION
BRANCH PREDICTION QUALIFIER

FIG. 4

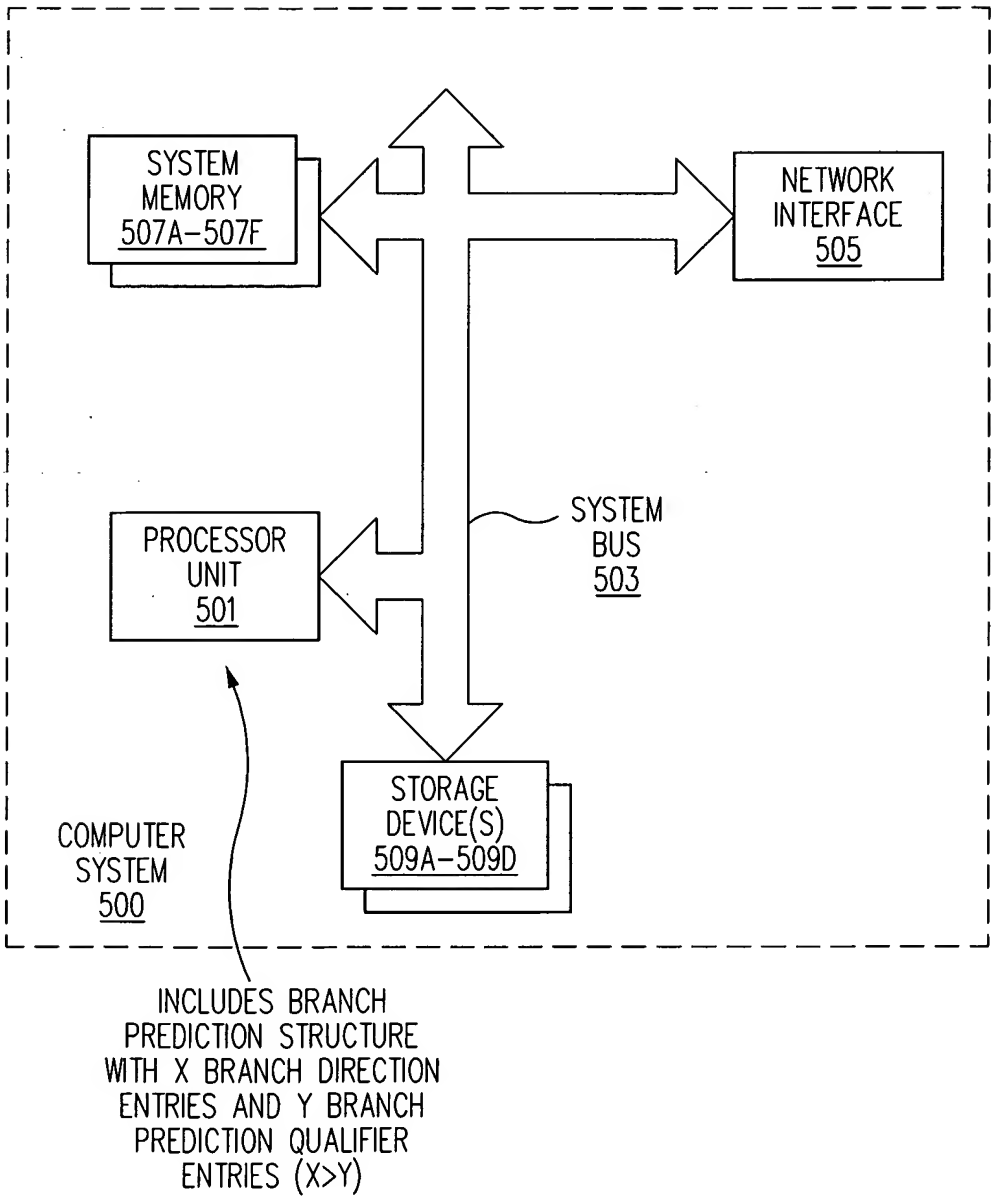
SYSTEM MEMORY 507A–507F
NETWORK INTERFACE 505
SYSTEM BUS 503
PROCESSOR UNIT 501
STORAGE DEVICE(S) 509A–509D
COMPUTER SYSTEM 500
INCLUDES BRANCH PREDICTION STRUCTURE WITH X BRANCH DIRECTION ENTRIES AND Y BRANCH PREDICTION QUALIFIER ENTRIES (X>Y)

FIG. 5